Using Economic Analysis to Value Water Quality Improvements: An Application to the Cheat River Watershed in West Virginia

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Inherent in any decision to allocate resources is the constraint imposed by a limited budget. In small communities, particularly in rural areas, this often means stark tradeoffs among major public projects (schools, roads, water treatment). When dealing with management options for ecosystems, it is often necessary to prioritize restoration projects (e.g., by maximizing the benefits per dollar spent on a project). In this study, we demonstrate the use of two non-market valuation techniques to assign economic value to marginal increases in the quality of water in streams affected by acid mine drainage. Our study area is a section of the Cheat River Watershed in West Virginia that suffers from acid mine drainage (AMD) impairment.

The first technique we employ is benefits transfer: a low-cost and increasingly common method for estimating economic values. Benefits transfer utilizes the point estimates or estimating function of previous similar studies to make statements about the effects of a proposed change. In our study, we derive willingness to pay (WTP) estimates from four previous water quality studies. Two of the studies examine watersheds where AMD is the cause of the impairment, and two are freshwater water pollution studies. Using estimates from the four studies, we compute the annual value of repairing a boatable-only waterway to a swimmable waterway to be between $1.2 and $2 million dollars.

In collaboration with researchers at West Virginia University, we also apply a more intensive method to measure and quantify environmental benefits known as hedonic price modeling. Hedonic price models are used for deriving implicit values from market prices (e.g., in air quality research).

We estimate the WTP for water quality through variation in housing values along the Cheat River. Recent successful remediation efforts on the Cheat have facilitated the return of aquatic life, while further downstream, severe impairment still exists. We use these differences to create treatment and control sections of the river and compare housing prices both pre- and post-remediation. Differences in housing values can provide us with insight into market valuation of

implicit goods, such as water quality.